Research on the Path and Implementation Strategy of Digital Transformation in Higher Education Institutions from the Perspective of Strategic Management

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Abstract: Against the backdrop of the deep integration of the digital economy and artificial intelligence technology, higher education institutions are facing multiple challenges, including the reconstruction of talent cultivation models, the optimal allocation of educational resources, and the upgrading of management efficiency. Taking strategic management as the core perspective, this paper integrates the Resource-Based View (RBV) and the Dynamic Capabilities Theory to construct a closed-loop analytical framework of "Resource - Capability - Performance", and systematically explores the path and implementation strategy of digital transformation in higher education institutions. Through literature review, case analysis, and mixed research methods, the paper first identifies core transformation resources such as teaching data, research platforms, and digital faculty; second, clarifies the dynamic capability cultivation dimensions consisting of learning ability, innovation ability, and integration ability; and further proposes three implementation strategies: strategic planning and organizational change, technology empowerment and data governance, and performance evaluation and continuous optimization. The study finds that the conflict between the traditional bureaucratic organization and the demand for digital agility is the core contradiction in transformation, and the synergy between resource integration and dynamic capabilities is the key to breaking through this contradiction. Ultimately, this paper provides theoretical support and operable paths for the digital transformation of higher education institutions, contributing to the construction of "Double First-Class" universities and the development of educational modernization.

***Keywords*:** higher education institutions; digital transformation; strategic management; resource-based view; dynamic capabilities theory

1. Introduction

1.1 Research Background and Significance

In the era of deep integration of the digital economy and artificial intelligence, higher education is facing an all-round transformation in talent cultivation, resource allocation, and management models. In terms of talent cultivation, the traditional knowledge-imparting model can hardly meet industrial demands. Fields such as fintech and intelligent manufacturing are in urgent need of interdisciplinary talents with both professional competence and digital skills, forcing universities to reconstruct a "theory + practice + digitalization" cultivation system. In terms of educational resource allocation, platforms like MOOCs have promoted the sharing of high-quality resources (e.g., China University MOOC has gathered over 20,000 courses serving hundreds of millions of learners), but the problem of "data silos" within universities is prominent, with resource duplication rates exceeding 30%, which restricts utilization efficiency. In terms of management models, traditional manual approval processes are redundant (e.g., student status changes take 1-2 weeks to process), while digital systems can significantly improve efficiency. After a "Double First-Class" university introduced smart academic administration, its administrative efficiency increased by 40%, and the coverage rate of dynamic teaching quality evaluation reached 100%[3].

Under the guidance of the "Double First-Class" construction, digital transformation has become the key to the core competitiveness of universities. For example, Tsinghua University established an intelligent manufacturing laboratory relying on digital twin technology, increasing the technology conversion rate by 25%[6]. Exploring the transformation path from the perspective of strategic management has both theoretical and practical value: theoretically, it can fill the gap in the application of the Resource- Based View and Dynamic Capabilities Theory in the education field; practically, it can provide implementation plans for universities, contributing to the high-quality development of education.

1.2 Research Objectives and Questions

1.2.1 Research Objectives

To construct a trinity digital transformation system of "theoretical framework - path design - strategy implementation": first, identify core resources and clarify the priority of allocation based on the Resource-Based View; second, design a "sensing - seizing - reconfiguring" transformation path combined with the Dynamic Capabilities Theory; third, propose implementation strategies from the strategic, organizational, and technical dimensions.

1.2.2 Core Questions

(1) From the perspective of the Resource-Based View, how to identify the key resources for the digital transformation of universities? What are the differences in core resources among research-oriented, application-oriented, and vocational colleges?

(2) How does the Dynamic Capabilities Theory guide the design of transformation paths? How to cultivate sensing, seizing, and reconfiguring capabilities to adapt to technological changes?

2. Theoretical Basis and Literature Review

2.1 Resource-Based View (RBV)

Proposed by Wernerfelt in 1984, the Resource-Based View holds that an organization's competitive advantage stems from the integration of internal heterogeneous and inimitable resources[1]. In the digital transformation of universities, this is mainly reflected in the excavation and allocation of three types of resources:

(1) Digital platform resources: As infrastructure, they have scale and network effects. For example, Tsinghua University's "Xuetang Online" integrates resources from over 300 universities, serving more than 500 million person-times; Zhejiang University's "Smart Research" platform integrates full-process services, increasing research management efficiency by 50%[6].

(2) Data asset resources: Teaching, research, and management data are analyzed to provide decision-making basis. Peking University's "Student Development Data Center" built an academic early warning model, reducing the failure rate by 18%; Shanghai Jiao Tong University's "Research Data Warehouse" integrates data of over 100,000 papers and 5,000+ projects, supporting interdisciplinary research[4].

(3) Human resources: The digital capabilities of teachers, the development capabilities of technical teams, and the data literacy of managers determine the effectiveness of transformation. Fudan University increased the proportion of teachers with digital teaching capabilities from 45% to 82% through training; Huawei cooperated with Shenzhen Polytechnic to train more than 100 "double-qualified" teachers (with both academic and industry experience) [5].

Resource integration requires breaking departmental barriers. For example, Nanjing University's "Digital Resource Collaboration Center" reduced the resource duplication rate from 35% to 12%; Beijing Normal University's "Educational Data Alliance" integrates data from multiple universities to provide references for policy formulation[4].

2.2 Dynamic Capabilities Theory

Proposed by Teece et al. in 1997, the Dynamic Capabilities Theory emphasizes adapting to environmental changes through "sensing - seizing - reconfiguring". In university transformation, this is reflected in the cultivation of three types of capabilities:

(1) Sensing capability: Establishing technology monitoring mechanisms, such as Zhejiang University setting up a research institute to release technology white papers, and Beihang University cooperating with enterprises to build a metaverse laboratory[7].

(2) Seizing capability: Establishing rapid decision-making and execution mechanisms, such as Huazhong University of Science and Technology completing the online migration of over 1,500 courses within 72 hours; Shenzhen University establishing a special task force to complete the first phase of smart campus construction in 3 months[5].

(3) Reconfiguring capability: Dynamically adjusting resources and structures, such as Xi'an Jiaotong University establishing the "Digital Interdisciplinary Research Institute"; South China University of Technology compressed administrative approval procedures to 3.5 links, shortening the time limit by 60%[4].

Agile organizations are the carriers for capability cultivation. For example, Tsinghua University's "Smart Teaching Innovation Project Team" adopted a two-week iteration model and completed 20 applications in 6 months; Zhejiang University of Technology implemented matrix management to achieve precise matching of resources and tasks[5].

2.3 Domestic and Foreign Research Progress

Foreign research has formed a dual-track pattern of technology application and strategic management: At the technical level, American studies found that interactive MOOCs have a 23% higher completion rate, and European studies confirmed that VR anatomy experiments improve operational proficiency by 40%; At the strategic level, the UK proposed a digital maturity model, and Australian studies found a positive correlation between presidents' strategic determination and resource investment[8].

Domestic research focuses on technology implementation and local adaptation: Technically, the AI essay correction system developed by Baidu in cooperation with Beijing Normal University has an accuracy rate of 92%; Strategically, scholars using the Resource-Based View found that the resource utilization rate of universities in eastern China is 35% higher than that in western China, and proposed a "policy - technology - talent" synergy model based on the Dynamic Capabilities Theory[4] [5].

Existing research has three shortcomings: focusing on a single theoretical perspective, lacking integrated analysis of resources and capabilities; emphasizing technical descriptions while ignoring strategic path design; insufficient empirical research and lack of comparisons among different types of universities. This study fills the above gaps through the integration of dual theories.

3. Analysis of the Current Situation of Digital Transformation in Higher Education Institutions

3.1 Current Situation and Challenges of Transformation

3.1.1 Current Situation of Transformation

At the technical application level, the popularization of digital infrastructure has achieved remarkable results. By 2024, 85% of universities nationwide have built online teaching platforms, and 60% have realized full coverage of smart classrooms. China University MOOC platform has launched 35,000 courses with over 300 million registered users; Chaoxing Fanya platform serves more than 1,200 universities with an annual course visit volume of 5 billion person-times. The functions of smart classrooms are continuously upgraded: for example, Peking University's "Intelligent Interactive Classroom" uses face recognition for attendance and real-time bullet screen interaction, increasing classroom participation by 30%; Harbin Institute of Technology's "Virtual Simulation Laboratory" covers more than 10 disciplines and serves 100,000 person-times of experimental teaching annually[6].

At the management model level, digital management has been gradually implemented. 70% of universities have introduced academic management systems to realize online course scheduling, course selection, and grade management; 50% of universities have established student management systems covering student status, rewards, and punishments. For example, Wuhan University's "Smart Student Affairs" system integrates more than 20 services, reducing the average processing time by 70%; Shanghai University of Finance and Economics' "Financial Intelligent Platform" shortened the reimbursement cycle from 15 days to 3 days[4].

3.1.2 Main Challenges

An imperfect data governance system is the core bottleneck: First, data standards are not unified, requiring manual intervention for cross-system data matching; Second, data quality is poor, with an average data completeness rate of only 65% and an error rate of 12% in universities; Third, security risks are prominent, with more than 30 data leakage incidents occurring in universities nationwide in 2023[4].

Organizational structure is disconnected from transformation needs: The traditional bureaucratic system has multiple levels and slow decision- making. For example, the project approval link for smart campus construction in a university took 2 months; Departmental collaboration barriers are obvious, and once the teaching platform project was delayed by 3 months due to unclear rights and responsibilities[5].

The shortage of digital talents restricts the process: 80% of universities have an information technology team of less than 50 people, and 70% of members lack educational management experience; Only 40% of teachers can proficiently use blended teaching tools, and 25% have basic data analysis capabilities[5].

3.2 Typical Case Analysis: Transformation Practice of Guangdong Country Garden Polytechnic

As a representative of vocational college transformation, its process focuses on "resource integration + dynamic capabilities" and progresses in three stages:

(1) Single-point technology breakthrough (2019-2020): Focusing on teaching scenarios, it built the "BZ Poly Online" platform (with over 200 courses) and 6 virtual training centers, replacing traditional equipment with an investment of over

10 million yuan, but the systems were independent and data could not be interconnected.

(2) Resource integration and upgrading (2021-2022): Established a transformation leading group, built a unified data center (integrating 8 systems and formulating 15 standards), and launched a "smart campus" portal (improving work efficiency by 60%). It trained 1,200 teachers annually, and 85% of them could independently design blended courses.

(3) System capability reconstruction (2023-present): Established cross-departmental agile teams, developed a "post - course - competition - certification" integration platform (with an employment rate of 98%), optimized professional settings through data (adding 4 popular majors), and co-built a "digital industry college" with enterprises, achieving a 30% annual increase in technical service revenue.

This case proves that vocational colleges need to realize transformation through the path of "technology application - resource integration - capability reconstruction".

4. Construction of Digital Transformation Path Based on Dual Theories

4.1 Path Design under the Resource-Based View

4.1.1 Identification of Core Resources

Research-oriented universities need to focus on research data resources. For example, Fudan University's "Life Science Big Data Platform" integrates data of over 100,000 biological samples to support national-level projects; Application-oriented universities focus on virtual training and industry data. For example, Zhejiang Wanli University's "E-commerce Digital Training Center" accesses Alibaba's data to train more than 5,000 practical talents; Vocational colleges need to strengthen skill training resources. For example, Shenzhen Polytechnic's "Skill Training Cloud Platform" provides courses for over 100 types of work, serving 20,000 person-times annually[5].

4.1.2 Resource Integration Path

Technically, construct a "cloud - edge - end" integrated architecture: Build a unified data center on the cloud to aggregate data, deploy terminal nodes on the edge to collect data, and develop application portals on the terminal to provide personalized services. For example, Nanjing University increased resource utilization by 45% through this architecture[4].

Managerially, establish a three-level coordination mechanism: The university-level resource management committee conducts overall planning, departments set up liaisons to connect resources, and project teams form collaboration groups to promote implementation. Tsinghua University completed interdisciplinary research resource integration in 6 months through this mechanism, facilitating more than 50 interdisciplinary research projects[6].

4.2 Capability Cultivation under the Dynamic Capabilities Theory

4.2.1 Cultivation of Sensing Capability

Establish a "technology monitoring - demand survey - trend analysis" system: Cooperate with enterprises and research institutions to monitor technology, collect teachers' and students' needs through questionnaires, and set up an expert committee to judge trends. Beijing Normal University laid out AI education evaluation technology in advance through this system and developed leading products[7].

4.2.2 Cultivation of Seizing Capability

Implement agile project management: Simplify approval processes (shortening the time limit to within 7 working days), adopt the "Minimum Viable Product" concept for iterative optimization, and establish a fault- tolerance mechanism. Zhejiang University's "Smart Teaching Tool Development Project" completed the prototype in 3 months and promoted it to the whole university in 6 months[5].

4.2.3 Cultivation of Reconfiguring Capability

Implement "organization - process - culture" three-dimensional reconstruction: Break departmental barriers to form cross-functional teams, reengineer core business processes, and cultivate digital thinking. South China Normal University compressed the teaching management process from 18 links to 8, with a teacher satisfaction rate of 90%[4].

4.3 Dual-Path Synergy Mechanism

Construct a closed-loop "Resource - Capability - Performance" model: Resources provide the foundation for capability cultivation, such as teaching data supporting teacher training; Capabilities optimize resource allocation, such as sensing capabilities accurately identifying resource needs; Performance evaluation feeds back to resource adjustment and capability improvement. A university optimized its data sharing platform through evaluation, increasing resource utilization by 35%[5].

5. Implementation Strategies from the Perspective of Strategic Management

5.1 Strategic Planning and Organizational Change

Formulate transformation strategies using the "SWOT-PEST" analysis method, and construct a system of "overall goals - phased goals - specific tasks". For example, Peking University set the goal of "building a world- class digital campus in three years" and promoted 10 tasks in three phases[4].

Optimize the three-level structure of "leading group - functional departments - project teams". Shanghai Jiao Tong University completed 28 digital projects in 2023 through this structure, exceeding the target[5].

5.2 Technology Empowerment and Data Governance

Construct a dual platform of "data middle platform + business middle platform": The data middle platform is responsible for data processing, and the business middle platform integrates core capabilities. Alibaba's cooperation with Zhejiang University shortened the new application development cycle by 60%[6].

Establish a "standard - quality - security" governance system: University of Science and Technology of China increased data completeness to 95% through this system, with no security incidents occurring[4].

5.3 Performance Evaluation and Continuous Optimization

Design a balanced scorecard system to evaluate from four dimensions: finance (input-output ratio), customers (teachers' and students' satisfaction), internal processes (project completion rate), and learning and growth (teacher literacy improvement rate) [5].

Establish a "quarterly evaluation - annual summary - three-year adjustment" mechanism. Fudan University adjusted the direction of 5 projects in 2023 based on this mechanism to better meet the needs of teachers and students[4].

6. Empirical Research Design and Methods

6.1 Selection of Research Methods

A mixed research method is adopted to combine the advantages of quantitative and qualitative research.

(1) Quantitative research: Design a "University Digital Transformation Maturity Questionnaire", covering 5 dimensions (strategic planning, resource construction, capability cultivation, etc.) and 20 indicators. Conduct a questionnaire survey on 50 universities of different types, and use SPSS software for descriptive statistics and correlation analysis to quantify the transformation status and influencing factors.

(2) Qualitative research: Select 3 typical universities (one research- oriented, one application-oriented, and one vocational college). Through in-depth interviews (10 managers and 20 teachers interviewed in each university), on-site observations, and document analysis, explore transformation pain points and successful experiences, and use Nvivo software for coding analysis[5].

6.2 Case Selection and Data Collection

6.2.1 Case Selection Criteria

(1) Type representativeness: Covering research-oriented, application-oriented, and vocational colleges;

(2) Transformation stage: In the middle stage of transformation (2-3 years), with both practical foundation and room for improvement;

(3) Geographical distribution: Covering eastern, central, and western regions to reflect regional differences[4].

6.2.2 Data Collection Methods

(1) Literature data: Collect official documents such as university digital transformation strategic plans and annual reports;

(2) Interview data: Conduct semi-structured interviews, record and transcribe the content;

(3) Operational data: Obtain data on university digital project investment, resource utilization, and performance evaluation[5].

7. Expected Innovations and Research Value

7.1 Theoretical Innovations

Construct an analytical framework integrating the Resource-Based View and Dynamic Capabilities Theory, breaking through the limitations of single-theory research and providing a new theoretical perspective for the digital transformation of higher education;

Propose a closed-loop synergy model of "Resource - Capability - Performance", reveal the interaction mechanism between resource integration and capability cultivation, and enrich the connotation of educational management theory;

Establish differentiated resource identification and capability cultivation paths for the digital transformation of different types of universities, enhancing the pertinence and applicability of the theory[1] [2] [4].

7.2 Practical Value

Provide universities with a list of core resource identification to clarify transformation priorities and avoid resource waste;

Design operable dynamic capability cultivation plans, such as sensing capability monitoring systems and agile project management models, to help universities improve transformation implementation capabilities;

The proposed strategies for strategic planning, organizational change, and performance evaluation can be directly applied to the digital transformation practice of universities. For example, the balanced scorecard evaluation system has been tried in 3 pilot universities with good results[5] [6].

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